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SEQUENCE LISTING

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Sellman, Brett R.

<120> Compounds and Methods for the Treatment
and Prevention of Bacterial Infection

<130> 00742/060002

<140> US 09/848,909

<141> 2001-05-04

<150> US 60/201,800

<151> 2000-05-04

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Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
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Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
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Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
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Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
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 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
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 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
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 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
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 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
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 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
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Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
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Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
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Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
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Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
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Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
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Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
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Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
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Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
260 265 270
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275 280 285
Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
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Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
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Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
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Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
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Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
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 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
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 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
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 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
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 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
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 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
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Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
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 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
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 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
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 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
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 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
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 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Thr Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
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 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
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 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
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 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
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 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
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 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
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 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
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Lys Asp Ile Thr Glu Phe	Asp Phe Asn Phe Asp	Gln Gln Thr Ser Gln		
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Asn Ile Lys Asn Gln Leu	Ala Glu Leu Asn Ala	Thr Asn Ile Tyr Thr		
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Val Leu Asp Lys Ile Lys	Leu Asn Ala Lys Met	Asn Ile Leu Ile Arg		
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Glu Ser Val Val Lys Glu	Ala His Arg Glu Val	Ile Asn Ser Ser Thr		
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Glu Gly Leu Leu Leu Asn	Ile Asp Lys Asp Ile	Arg Lys Ile Leu Ser		
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Gly Tyr Ile Val Glu Ile	Glu Asp Thr Glu Gly	Leu Lys Glu Val Ile		
	645	650	655	
Asn Asp Arg Tyr Asp Met	Leu Asn Ile Ser Ser	Leu Arg Gln Asp Gly		
	660	665	670	
Lys Thr Phe Ile Asp Phe	Lys Lys Tyr Asn Asp	Lys Leu Pro Leu Tyr		
	675	680	685	
Ile Ser Asn Pro Asn Tyr	Lys Val Asn Val Tyr	Ala Val Thr Lys Glu		
	690	695	700	
Asn Thr Ile Ile Asn Pro	Ser Glu Asn Gly Asp	Thr Ser Thr Asn Gly		
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<400> 4

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Met Val Val Thr Ser Ser	Thr Thr Gly Asp	Leu Ser Ile Pro Ser Ser
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Ser Asn Ser Arg Lys Lys	Arg Ser Thr Ser Ala	Gly Pro Thr Val Pro
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Thr Val Asp Val Lys Asn	Lys Arg Thr Phe Leu	Ser Pro Trp Ile Ser
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12

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225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250						255
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265							270
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
	275						280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
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Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
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Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
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Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu
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Asn	Thr	Ala	Asp	Thr	Ala	Arg	Leu	Asn	Ala	Asn	Ile	Arg	Tyr	Val	Asn
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Leu	Ser	Gln	Ile	Leu	Ala	Pro	Asn	Asn	Tyr	Tyr	Pro	Ser	Lys	Asn	Leu
				405					410						415
Ala	Pro	Ile	Ala	Leu	Asn	Ala	Gln	Asp	Phe	Ser	Ser	Thr	Pro	Ile	
			420					425					430		
Thr	Met	Asn	Tyr	Asn	Gln	Phe	Leu	Glu	Leu	Glu	Lys	Thr	Lys	Gln	Leu
	435						440					445			
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Glu	Asn	Gly	Arg	Val	Arg	Val	Asp	Thr	Gly	Ser	Asn	Trp	Ser	Glu	Val
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Leu	Pro	Gln	Ile	Gln	Glu	Thr	Thr	Ala	Arg	Ile	Ile	Phe	Asn	Gly	Lys
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Asp	Leu	Asn	Leu	Val	Glu	Arg	Arg	Ile	Ala	Ala	Val	Asn	Pro	Ser	Asp
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Pro	Leu	Glu	Thr	Thr	Lys	Pro	Asp	Met	Thr	Leu	Lys	Glu	Ala	Leu	Lys
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Gly	Tyr	Ile	Val	Glu	Ile	Glu	Asp	Thr	Glu	Gly	Leu	Lys	Glu	Val	Ile
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 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
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 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
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 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
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 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
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 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
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 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
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 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
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 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
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 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
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 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
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<213> Bacillus anthracis

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 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
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 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
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 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
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 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
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 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
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 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
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 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
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 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
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 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro

12

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Lys	Trp	Ser	Thr	210	Ala	Ser	Asp	Pro	Tyr	215	Ser	Asp	Phe	Glu	Lys	220	Val	Thr
Gly	Arg	Ile	Asp	225	Lys	Asn	Val	Ser	Pro	230	Glu	Ala	Arg	His	Pro	235	Leu	Val
Ala	Ala	Tyr	Pro	245	Ile	Val	His	Val	Asp	250	Met	Glu	Asn	Ile	Ile	255	Leu	Ser
Lys	Asn	Glu	Asp	260	Gln	Ser	Thr	Gln	Asn	265	Thr	Asp	Ser	Glu	Thr	270	Arg	Thr
Ile	Ser	Lys	Asn	275	Thr	Ser	Thr	Ser	Arg	280	Thr	His	Thr	Ser	Glu	285	Val	His
Gly	Asn	Ala	Glu	290	Val	His	Ala	Ser	Phe	295	Phe	Asp	Ile	Gly	Gly	300	Ser	Val
Ser	Ala	Gly	Phe	305	Ser	Asn	Ser	Asn	Ser	310	Ser	Thr	Val	Ala	Ile	315	Asp	His
Ser	Leu	Ser	Leu	325	Ala	Gly	Glu	Arg	Thr	330	Trp	Ala	Glu	Thr	Met	335	Gly	Leu
Asn	Thr	Ala	Asp	340	Thr	Ala	Arg	Leu	Asn	345	Ala	Asn	Ile	Arg	Tyr	350	Val	Asn
Thr	Gly	Thr	Ala	355	Pro	Ile	Tyr	Asn	Val	360	Leu	Pro	Thr	Thr	Ser	365	Leu	Val
Leu	Gly	Lys	Asn	370	Gln	Thr	Leu	Ala	Thr	375	Ile	Lys	Ala	Lys	Glu	380	Asn	Gln
Leu	Ser	Gln	Ile	385	Leu	Ala	Pro	Asn	Asn	390	Tyr	Tyr	Pro	Ser	Lys	395	Asn	Leu
Ala	Pro	Ile	Ala	405	Leu	Asn	Ala	Gln	Glu	410	Asp	Phe	Ser	Ser	Thr	415	Pro	Ile
Thr	Met	Asn	Tyr	420	Asn	Gln	Phe	Leu	Glu	425	Leu	Glu	Lys	Thr	Lys	430	Gln	Leu
Arg	Leu	Asp	Thr	435	Asp	Gln	Val	Tyr	Gly	440	Asn	Ile	Ala	Thr	Tyr	445	Asn	Phe
Glu	Asn	Gly	Arg	450	Val	Arg	Val	Asp	Thr	455	Gly	Ser	Asn	Trp	Ser	460	Glu	Val
Leu	Pro	Gln	Ile	465	Gln	Glu	Thr	Thr	Ala	470	Arg	Ile	Ile	Phe	Asn	475	Gly	Lys
Asp	Leu	Asn	Leu	485	Val	Glu	Arg	Arg	Ile	490	Ala	Ala	Val	Asn	Pro	495	Ser	Asp
Pro	Leu	Glu	Thr	500	Thr	Lys	Pro	Asp	Met	505	Thr	Leu	Lys	Glu	Ala	510	Leu	Lys
Ile	Ala	Phe	Gly	515	Phe	Asn	Glu	Pro	Asn	520	Gly	Asn	Leu	Gln	Tyr	525	Gln	Gly
Lys	Asp	Ile	Thr	530	Glu	Phe	Asp	Phe	Asn	535	Phe	Asp	Gln	Gln	Thr	540	Ser	Gln
Asn	Ile	Lys	Asn	545	Gln	Leu	Ala	Glu	Leu	550	Asn	Ala	Thr	Asn	Ile	555	Tyr	Thr
Val	Leu	Asp	Lys	565	Ile	Lys	Leu	Asn	Ala	570	Lys	Met	Asn	Ile	Leu	575	Ile	Arg
Asp	Lys	Arg	Phe	580	His	Tyr	Asp	Arg	Asn	585	Asn	Ile	Ala	Val	Gly	590	Ala	Asp
Glu	Ser	Val	Val	595	Lys	Glu	Ala	His	Arg	600	Glu	Val	Ile	Asn	Ser	605	Ser	Thr
Glu	Gly	Leu	Leu	610	Leu	Asn	Ile	Asp	Lys	615	Asp	Ile	Arg	Lys	Ile	620	Leu	Ser
625										630						635		640

Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 8
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<400> 8
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
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 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255

 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val

<400> 9

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Ala Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460

Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 10
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<400> 10
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
~~Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val~~
~~85 90 95~~
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu

130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Asp Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Lys Asp Phe Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605

Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 11
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<400> 11
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220

 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr

275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Asp Ala Asp Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Lys Lys Phe Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 12
 <211> 711
 <212> PRT
 <213> Bacillus anthracis

<400> 12

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn
 290 295 300
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg
 305 310 315 320
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu
 325 330 335
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn
 340 345 350
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala
 355 360 365
 Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn
 370 375 380

Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln
 385 390 395 400
 Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu
 405 410 415
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr

420 425 430
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp
 435 440 445
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr
 450 455 460
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg
 465 470 475 480
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp
 485 490 495
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro
 500 505 510
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe
 515 520 525
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu
 530 535 540
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn
 545 550 555 560
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg
 565 570 575
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His
 580 585 590
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp
 595 600 605
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp
 610 615 620
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn
 625 630 635 640
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys
 645 650 655
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val
 660 665 670
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu
 675 680 685
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser
 690 695 700
 Lys Lys Gly Tyr Glu Ile Gly
 705 710

<210> 13
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<400> 13
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110

Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Asp Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Lys Asp Ala Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg

Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn
 290 295 300
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg
 305 310 315 320
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu
 325 330 335
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn
 340 345 350
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala
 355 360 365
 Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn
 370 375 380
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln
 385 390 395 400
 Asp Asp Ala Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu
 405 410 415
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr
 420 425 430
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp
 435 440 445
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr
 450 455 460
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg
 465 470 475 480
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp
 485 490 495
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro
 500 505 510
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe
 515 520 525
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu
 530 535 540
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn
 545 550 555 560
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg
 565 570 575
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His
 580 585 590
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp
 595 600 605
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp
 610 615 620
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn
 625 630 635 640
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys
 645 650 655
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val
 660 665 670
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu
 675 680 685
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser
 690 695 700
 Lys Lys Gly Tyr Glu Ile Gly
 705 710

<210> 15
 <211> 711
 <212> PRT
 <213> Bacillus anthracis

<400> 15
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn
 290 295 300
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg
 305 310 315 320
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu
 325 330 335
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn
 340 345 350
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala
 355 360 365
 Thr Ile Lys Ala Asp Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn
 370 375 380
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln
 385 390 395 400
 Asp Asp Ala Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu
 405 410 415
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr

420 425 430
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp
 435 440 445
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr
 450 455 460
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg
 465 470 475 480
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp
 485 490 495
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro
 500 505 510
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe
 515 520 525
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu
 530 535 540
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn
 545 550 555 560
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg
 565 570 575
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His
 580 585 590
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp
 595 600 605
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp
 610 615 620
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn
 625 630 635 640
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys
 645 650 655
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val
 660 665 670
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu
 675 680 685
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser
 690 695 700
 Lys Lys Gly Tyr Glu Ile Gly
 705 710

<210> 16
 <211> 711
 <212> PRT
 <213> Bacillus anthracis

<400> 16
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110

Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Asn Ser Asn
 290 295 300
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg
 305 310 315 320
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu
 325 330 335
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn
 340 345 350
 Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala
 355 360 365
 Thr Ile Lys Ala Asp Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn
 370 375 380
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln
 385 390 395 400
 Lys Asp Ala Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu
 405 410 415
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr
 420 425 430
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp
 435 440 445
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr
 450 455 460
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg
 465 470 475 480
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp
 485 490 495
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro
 500 505 510
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe
 515 520 525
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu
 530 535 540
 Leu Asn Ala Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn
 545 550 555 560
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg
 565 570 575
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His

Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 18
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<400> 18

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380

Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Lys Ser Ser Thr Pro Ile

420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 19
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<220>
 <221> VARIANT
 <222> 397
 <223> Xaa = any amino acid except Lys

<400> 19
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile

50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Xaa Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525

Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

C2

<210> 20
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

<400> 20
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser

195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670

Lys	Thr	Phe	Ile	Asp	Phe	Lys	Lys	Tyr	Asn	Asp	Lys	Leu	Pro	Leu	Tyr
		675					680					685			
Ile	Ser	Asn	Pro	Asn	Tyr	Lys	Val	Asn	Val	Tyr	Ala	Val	Thr	Lys	Glu
	690					695					700				
Asn	Thr	Ile	Ile	Asn	Pro	Ser	Glu	Asn	Gly	Asp	Thr	Ser	Thr	Asn	Gly
705				710						715					720
Ile	Lys	Lys	Ile	Leu	Ile	Phe	Ser	Lys	Lys	Gly	Tyr	Glu	Ile	Gly	
			725						730					735	

<210> 21
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

12

<400> 21															
Glu	Val	Lys	Gln	Glu	Asn	Arg	Leu	Leu	Asn	Glu	Ser	Glu	Ser	Ser	Ser
1				5					10					15	
Gln	Gly	Leu	Leu	Gly	Tyr	Tyr	Phe	Ser	Asp	Leu	Asn	Phe	Gln	Ala	Pro
			20					25					30		
Met	Val	Val	Thr	Ser	Ser	Thr	Thr	Gly	Asp	Leu	Ser	Ile	Pro	Ser	Ser
		35					40					45			
Glu	Leu	Glu	Asn	Ile	Pro	Ser	Glu	Asn	Gln	Tyr	Phe	Gln	Ser	Ala	Ile
	50					55					60				
Trp	Ser	Gly	Phe	Ile	Lys	Val	Lys	Lys	Ser	Asp	Glu	Tyr	Thr	Phe	Ala
65				70						75					80
Thr	Ser	Ala	Asp	Asn	His	Val	Thr	Met	Trp	Val	Asp	Asp	Gln	Glu	Val
				85					90					95	
Ile	Asn	Lys	Ala	Ser	Asn	Ser	Asn	Lys	Ile	Arg	Leu	Glu	Lys	Gly	Arg
			100					105					110		
Leu	Tyr	Gln	Ile	Lys	Ile	Gln	Tyr	Gln	Arg	Glu	Asn	Pro	Thr	Glu	Lys
		115					120					125			
Gly	Leu	Asp	Phe	Lys	Leu	Tyr	Trp	Thr	Asp	Ser	Gln	Asn	Lys	Lys	Glu
	130					135					140				
Val	Ile	Ser	Ser	Asp	Asn	Leu	Gln	Leu	Pro	Glu	Leu	Lys	Gln	Lys	Ser
145					150					155					160
Ser	Asn	Ser	Arg	Lys	Lys	Arg	Ser	Thr	Ser	Ala	Gly	Pro	Thr	Val	Pro
				165					170					175	
Asp	Arg	Asp	Asn	Asp	Gly	Ile	Pro	Asp	Ser	Leu	Glu	Val	Glu	Gly	Tyr
			180					185					190		
Thr	Val	Asp	Val	Lys	Asn	Lys	Arg	Thr	Phe	Leu	Ser	Pro	Trp	Ile	Ser
		195					200					205			
Asn	Ile	His	Glu	Lys	Lys	Gly	Leu	Thr	Lys	Tyr	Lys	Ser	Ser	Pro	Glu
	210					215					220				
Lys	Trp	Ser	Thr	Ala	Ser	Asp	Pro	Tyr	Ser	Asp	Phe	Glu	Lys	Val	Thr
225					230					235					240
Gly	Arg	Ile	Asp	Lys	Asn	Val	Ser	Pro	Glu	Ala	Arg	His	Pro	Leu	Val
				245					250					255	
Ala	Ala	Tyr	Pro	Ile	Val	His	Val	Asp	Met	Glu	Asn	Ile	Ile	Leu	Ser
			260					265					270		
Lys	Asn	Glu	Asp	Gln	Ser	Thr	Gln	Asn	Thr	Asp	Ser	Glu	Thr	Arg	Thr
		275					280					285			
Ile	Ser	Lys	Asn	Thr	Ser	Thr	Ser	Arg	Thr	His	Thr	Ser	Glu	Val	His
	290					295					300				
Gly	Asn	Ala	Glu	Val	His	Ala	Ser	Phe	Phe	Asp	Ile	Gly	Gly	Ser	Val
305					310					315					320
Ser	Ala	Gly	Phe	Ser	Asn	Ser	Asn	Ser	Ser	Thr	Val	Ala	Ile	Asp	His
				325					330					335	
Ser	Leu	Ser	Leu	Ala	Gly	Glu	Arg	Thr	Trp	Ala	Glu	Thr	Met	Gly	Leu

340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 22

<211> 2208

<212> DNA

<213> Bacillus anthracis

<400> 22

gaagttaaac aggagaaccg gttattaaat gaatcagaat caagttccca ggggttacta 60
 ggatactatt ttagtgattt gaattttcaa gcacccatgg tgggttacctc ttctactaca 120

ggggatttat ctattcctag ttctgagtta gaaaatattc catcggaaaa ccaatatttt 180
 caatctgcta tttggtcagg atttatcaaa gttaagaaga gtgatgaata tacatttgct 240
 acttcgctg ataatcatgt aacaatgtgg gtagatgacc aagaagtgat taataaagct 300
 tctaattcta acaaaatcag attagaaaaa ggaagattat atcaaaaaa aattcaatat 360
 caacgagaaa atcctactga aaaaggattg gatttcaagt tgtactggac cgattctcaa 420
 aataaaaaag aagtgatttc tagtgataac ttacaattgc cagaattaaa acaaaaatct 480
 tcgaactcaa gaaaaaagcg aagtacaagt gctggaccta cggttccaga ccgtgacaat 540
 gatggaatcc ctgattcatt agaggtagaa ggatatacgg ttgatgtcaa aaataaaaga 600
 acttttcttt caccatggat ttctaatttt catgaaaaga aaggattaac caaatataaa 660
 tcatctctg aaaaatggag cacggcttct gatccgtaca gtgatttcga aaaggttaca 720
 ggacggattg ataagaatgt atcaccagag gcaagacacc cccttggtgc agcttatccg 780
 attgtacatg tagatatgga gaattatttt ctctcaaaaa atgaggatca atccacacag 840
 aatactgata gtgaaacgag aacaataagt aaaaatactt ctacaagtag gacacatact 900
 agtgaagtag atggaaatgc agaagtgcac gcgtcgttct ttgatattgg tgggagtgtg 960
 tctgcaggat ttagtaattc gaattcaagt acggctcgca ttgatcattc actatctcta 1020
 gcaggggaaa gaacttgagg tgaaacaatg ggttttaata ccgctgatac agcaagatta 1080
 aatgccaaata ttagatatgt aaatactggg acggctccaa tctacaacgt gttaccaacg 1140
 acttcgtagg tgtaggaaa aaatcaaaac ctgcgcgcaa ttaaagctaa ggaaaaccaa 1200
 ttaagtcaaa tacttgacac taataattat tatccttcta aaaacttggc gccaatcgca 1260
 ttaaatgcac aagacgattt cagttctact ccaattacaa tgaattacaa tcaatttctt 1320
 gagttagaaa aaacgaaaca attaagatta gatacggatc aagtatatgg gaatatagca 1380
 acatacaatt ttgaaaatgg aagagtggag gtggatacag gctcgaactg gagtgaagtg 1440
 ttaccgcaaa ttcaagaaac aactgcacgt atcattttta atggaaaaga tttaaactctg 1500
 gtgaaaggcg ggtagcggc ggtaaactct agtgatccat tagaaacgac taaaccggat 1560
 atgacattaa aagaagccct taaaatagca tttggattta acgaaccgaa tggaaactta 1620
 caatatcaag ggaagacat aaccgaattt gattttaatt tcgatcaaca aacatctcaa 1680
 aatatcaaga atcagttagc ggaattaaac gcaactaaca tatatactgt attagataaa 1740
 atcaaatata atgcaaaaat gaattttta ataagagata aacgttttca ttatgataga 1800
 aataacatag cagttggggc ggatgagtca gtagttaagg aggctcatag agaagtaatt 1860
 aattcgtaaa cagagggatt attgttaaat attgataagg atataagaaa aatattatca 1920
 gggtatattg tagaaattga agatactgaa gggcttaaa aagtataaaa tgacagatat 1980
 gatattgtga atatttctag ttacggcaa gatggaaaa catttataga ttttaaaaaa 2040
 tataatgata aattaccgtt atatataggt aatcccaatt ataaggtaaa tgtatatgct 2100
 gttactaaag aaaacactat tattaatcct agtgagaatg gggatactag taccaacggg 2160
 atcaagaaaa ttttaattct ttctaaaaaa ggctatgaga taggataa 2208

<210> 23
 <211> 735
 <212> PRT
 <213> Bacillus anthracis

 <220>
 <221> VARIANT
 <222> 427
 <223> Xaa = any amino acid except Phe

<400> 23
 Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro
 20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95

Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Glu Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Xaa Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495
 Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Ala Thr Asn Ile Tyr Thr

565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 24
 <211> 599
 <212> PRT
 <213> Bacillus anthracis

42
 <400> 24
 Thr Asp Ser Gln Asn Lys Lys Glu Val Ile Ser Ser Asp Asn Leu Gln
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 Leu Pro Glu Leu Lys Gln Lys Ser Ser Asn Ser Arg Lys Lys Arg Ser
 20 25 30
 Thr Ser Ala Gly Pro Thr Val Pro Asp Arg Asp Asn Asp Gly Ile Pro
 35 40 45
 Asp Ser Leu Glu Val Glu Gly Tyr Thr Val Asp Val Lys Asn Lys Arg
 50 55 60
 Thr Phe Leu Ser Pro Trp Ile Ser Asn Ile His Glu Lys Lys Gly Leu
 65 70 75 80
 Thr Lys Tyr Lys Ser Ser Pro Glu Lys Trp Ser Thr Ala Ser Asp Pro
 85 90 95
 Tyr Ser Asp Phe Glu Lys Val Thr Gly Arg Ile Asp Lys Asn Val Ser
 100 105 110
 Pro Glu Ala Arg His Pro Leu Val Ala Tyr Pro Ile Val His Val
 115 120 125
 Asp Met Glu Asn Ile Ile Leu Ser Lys Asn Glu Asp Gln Ser Thr Gln
 130 135 140
 Asn Thr Asp Ser Gln Thr Arg Thr Ile Ser Lys Asn Thr Ser Thr Ser
 145 150 155 160
 Arg Thr His Thr Ser Glu Val His Gly Asn Ala Glu Val His Ala Ser
 165 170 175
 Phe Phe Asp Ile Gly Gly Ser Val Ser Ala Gly Phe Ser Asn Ser Asn
 180 185 190
 Ser Ser Thr Val Ala Ile Asp His Ser Leu Ser Leu Ala Gly Glu Arg
 195 200 205
 Thr Trp Ala Glu Thr Met Gly Leu Asn Thr Ala Asp Thr Ala Arg Leu
 210 215 220
 Asn Ala Asn Ile Arg Tyr Val Asn Thr Gly Thr Ala Pro Ile Tyr Asn
 225 230 235 240

Val Leu Pro Thr Thr Ser Leu Val Leu Gly Lys Asn Gln Thr Leu Ala
 245 250 255
 Thr Ile Lys Ala Lys Glu Asn Gln Leu Ser Gln Ile Leu Ala Pro Asn
 260 265 270
 Asn Tyr Tyr Pro Ser Lys Asn Leu Ala Pro Ile Ala Leu Asn Ala Gln
 275 280 285
 Asp Asp Phe Ser Ser Thr Pro Ile Thr Met Asn Tyr Asn Gln Phe Leu
 290 295 300
 Glu Leu Glu Lys Thr Lys Gln Leu Arg Leu Asp Thr Asp Gln Val Tyr
 305 310 315 320
 Gly Asn Ile Ala Thr Tyr Asn Phe Glu Asn Gly Arg Val Arg Val Asp
 325 330 335
 Thr Gly Ser Asn Trp Ser Glu Val Leu Pro Gln Ile Gln Glu Thr Thr
 340 345 350
 Ala Arg Ile Ile Phe Asn Gly Lys Asp Leu Asn Leu Val Glu Arg Arg
 355 360 365
 Ile Ala Ala Val Asn Pro Ser Asp Pro Leu Glu Thr Thr Lys Pro Asp
 370 375 380
 Met Thr Leu Lys Glu Ala Leu Lys Ile Ala Phe Gly Phe Asn Glu Pro
 385 390 395 400
 Asn Gly Asn Leu Gln Tyr Gln Gly Lys Asp Ile Thr Glu Phe Asp Phe
 405 410 415
 Asn Phe Asp Gln Gln Thr Ser Gln Asn Ile Lys Asn Gln Leu Ala Glu
 420 425 430
 Leu Asn Val Thr Asn Ile Tyr Thr Val Leu Asp Lys Ile Lys Leu Asn
 435 440 445
 Ala Lys Met Asn Ile Leu Ile Arg Asp Lys Arg Phe His Tyr Asp Arg
 450 455 460
 Asn Asn Ile Ala Val Gly Ala Asp Glu Ser Val Val Lys Glu Ala His
 465 470 475 480
 Arg Glu Val Ile Asn Ser Ser Thr Glu Gly Leu Leu Leu Asn Ile Asp
 485 490 495
 Lys Asp Ile Arg Lys Ile Leu Ser Gly Tyr Ile Val Glu Ile Glu Asp
 500 505 510
 Thr Glu Gly Leu Lys Glu Val Ile Asn Asp Arg Tyr Asp Met Leu Asn
 515 520 525
 Ile Ser Ser Leu Arg Gln Asp Gly Lys Thr Phe Ile Asp Phe Lys Lys
 530 535 540
 Tyr Asn Asp Lys Leu Pro Leu Tyr Ile Ser Asn Pro Asn Tyr Lys Val
 545 550 555 560
 Asn Val Tyr Ala Val Thr Lys Glu Asn Thr Ile Ile Asn Pro Ser Glu
 565 570 575
 Asn Gly Asp Thr Ser Thr Asn Gly Ile Lys Lys Ile Leu Ile Phe Ser
 580 585 590
 Lys Lys Gly Tyr Glu Ile Gly
 595

<210> 25
 <211> 705
 <212> PRT
 <213> Clostridium difficile

<400> 25
 Glu Leu Asp Gly Met Lys Lys Ile Ile Pro Glu Glu Asn Leu Phe Leu
 1 5 10 15
 Arg Asp Tyr Ser Asn Ile Glu Lys Asp Asp Pro Phe Ile Pro Asn Asn
 20 25 30
 Asn Phe Phe Asp Pro Lys Leu Met Ser Asp Trp Glu Asp Glu Asp Leu

35 40 45
 Asp Thr Asp Asn Asp Asn Ile Pro Asp Ser Tyr Glu Arg Asn Gly Tyr
 50 55 60
 Thr Ile Lys Asp Leu Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Glu
 65 70 75 80
 Gln Gly Tyr Lys Lys Tyr Val Ser Asn Tyr Leu Glu Ser Asn Thr Ala
 85 90 95
 Gly Asp Pro Tyr Thr Asp Tyr Glu Lys Ala Ser Gly Ser Phe Asp Lys
 100 105 110
 Ala Ile Lys Thr Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Ile
 115 120 125
 Val Gly Val Gly Met Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala
 130 135 140
 Ser Thr Asp Gln Gly Lys Thr Val Ser Arg Ala Thr Thr Asn Ser Lys
 145 150 155 160
 Thr Glu Ser Asn Thr Ala Gly Val Ser Val Asn Val Gly Tyr Gln Asn
 165 170 175
 Gly Phe Thr Ala Asn Val Thr Thr Asn Tyr Ser His Thr Thr Asp Asn
 180 185 190
 Ser Thr Ala Val Gln Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu
 195 200 205
 Ser Ile Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr
 210 215 220
 Tyr Asn Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr Asn
 225 230 235 240
 Leu Val Leu Asp Gly Asp Thr Leu Ser Thr Ile Lys Ala Gln Glu Asn
 245 250 255
 Gln Ile Gly Asn Asn Leu Ser Pro Gly Asp Thr Tyr Pro Lys Lys Gly
 260 265 270
 Leu Ser Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu
 275 280 285
 Ile Pro Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ala Gly Lys Gln
 290 295 300
 Ile Lys Leu Glu Thr Thr Gln Val Ser Gly Asn Phe Gly Thr Lys Asn
 305 310 315 320
 Ser Ser Gly Gln Ile Val Thr Glu Gly Asn Ser Trp Ser Asp Tyr Ile
 325 330 335
 Ser Gln Ile Asp Ser Ile Ser Ala Ser Ile Ile Leu Asp Thr Glu Asn
 340 345 350
 Glu Ser Tyr Glu Arg Arg Val Thr Ala Lys Asn Leu Gln Asp Pro Glu
 355 360 365
 Asp Lys Thr Pro Glu Leu Thr Ile Gly Glu Ala Ile Glu Lys Ala Phe
 370 375 380
 Gly Ala Thr Lys Lys Asp Gly Leu Leu Tyr Phe Asn Asp Ile Pro Ile
 385 390 395 400
 Asp Glu Ser Cys Val Glu Leu Ile Phe Asp Asp Asn Thr Ala Asn Lys
 405 410 415
 Ile Lys Asp Ser Leu Lys Thr Leu Ser Asp Lys Lys Ile Tyr Asn Val
 420 425 430
 Lys Leu Glu Arg Gly Met Asn Ile Leu Ile Lys Thr Pro Thr Tyr Phe
 435 440 445
 Thr Asn Phe Asp Asp Tyr Asn Asn Tyr Pro Ser Thr Trp Ser Asn Val
 450 455 460
 Asn Thr Thr Asn Gln Asp Gly Leu Gln Gly Ser Ala Asn Lys Leu Asn
 465 470 475 480
 Gly Glu Thr Lys Ile Lys Ile Pro Met Ser Glu Leu Lys Pro Tyr Lys
 485 490 495
 Arg Tyr Val Phe Ser Gly Tyr Ser Lys Asp Pro Leu Thr Ser Asn Ser
 500 505 510

Ile Ile Val Lys Ile Lys Ala Lys Glu Glu Lys Thr Asp Tyr Leu Val
 515 520 525
 Pro Glu Gln Gly Tyr Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr Glu
 530 535 540
 Lys Asp Ser Ser Asn Ile Glu Ile Thr Leu Ile Gly Ser Gly Thr Thr
 545 550 555 560
 Tyr Leu Asp Asn Leu Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile
 565 570 575
 Leu Asp Glu Pro Glu Val Lys Ile Pro Thr Asp Gln Glu Ile Met Asp
 580 585 590
 Ala His Lys Ile Tyr Phe Ala Asp Leu Asn Phe Asn Pro Ser Thr Gly
 595 600 605
 Asn Thr Tyr Ile Asn Gly Met Tyr Phe Ala Pro Thr Gln Thr Asn Lys
 610 615 620
 Glu Ala Leu Asp Tyr Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln
 625 630 635 640
 Tyr Ser Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Met Arg Asn
 645 650 655
 Tyr Leu Gly Asp Pro Asn Gln Pro Lys Thr Asn Tyr Val Asn Leu Arg
 660 665 670
 Ser Tyr Phe Thr Gly Gly Glu Asn Ile Met Thr Tyr Lys Lys Leu Arg
 675 680 685
 Ile Tyr Ala Ile Thr Pro Asp Arg Glu Leu Leu Val Leu Ser Val
 690 695 700
 Asp
 705

<210> 26
 <211> 706
 <212> PRT
 <213> Clostridium perfringens

<400> 26
 Glu Leu Asn Gly Asn Lys Thr Val Ile Pro Glu Glu Asn Leu Phe Phe
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 Arg Asp Tyr Ser Lys Ile Asp Glu Asn Asp Pro Phe Ile Pro Asn Asn
 20 25 30
 Asn Phe Phe Asp Val Arg Phe Phe Ser Ala Ala Trp Glu Asp Glu Asp
 35 40 45
 Leu Asp Thr Asp Asn Asp Asn Ile Pro Asp Ala Tyr Glu Lys Asn Gly
 50 55 60
 Tyr Thr Ile Lys Asp Ser Ile Ala Val Lys Trp Asn Asp Ser Phe Ala
 65 70 75 80
 Glu Gln Gly Tyr Lys Lys Tyr Val Ser Ser Tyr Leu Glu Ser Asn Thr
 85 90 95
 Ala Gly Asp Pro Tyr Thr Asp Tyr Gln Lys Ala Ser Gly Ser Ile Asp
 100 105 110
 Lys Ala Ile Lys Leu Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro
 115 120 125
 Val Val Gly Val Gly Met Glu Asn Leu Ile Ile Ser Thr Asn Glu His
 130 135 140
 Ala Ser Ser Asp Gln Gly Lys Thr Val Ser Arg Ala Thr Thr Asn Ser
 145 150 155 160
 Lys Thr Asp Ala Asn Thr Val Gly Val Ser Ile Ser Ala Gly Tyr Gln
 165 170 175
 Asn Gly Phe Thr Gly Asn Ile Thr Thr Ser Tyr Ser His Thr Thr Asp
 180 185 190
 Asn Ser Thr Ala Val Gln Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly

195 200 205
 Leu Ser Ile Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg
 210 215 220
 Tyr Tyr Asn Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr
 225 230 235 240
 Asn Leu Val Leu Asp Gly Glu Thr Leu Ala Thr Ile Lys Ala Gln Asp
 245 250 255
 Asn Gln Ile Gly Asn Asn Leu Ser Pro Asn Glu Thr Tyr Pro Lys Lys
 260 265 270
 Gly Leu Ser Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Asn Ala Arg
 275 280 285
 Leu Ile Pro Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ser Gly Lys
 290 295 300
 Gln Ile Lys Leu Glu Thr Thr Gln Val Ser Gly Asn Tyr Gly Thr Lys
 305 310 315 320
 Asn Ser Gln Gly Gln Ile Ile Thr Glu Gly Asn Ser Trp Ser Asn Tyr
 325 330 335
 Ile Ser Gln Ile Asp Ser Val Ser Ala Ser Ile Ile Leu Asp Thr Gly
 340 345 350
 Ser Gln Thr Phe Glu Arg Arg Val Ala Ala Lys Glu Gln Gly Asn Pro
 355 360 365
 Glu Asp Lys Thr Pro Glu Ile Thr Ile Gly Glu Ala Ile Lys Lys Ala
 370 375 380
 Phe Ser Ala Thr Lys Asn Gly Glu Leu Leu Tyr Phe Asn Gly Ile Pro
 385 390 395 400
 Ile Asp Glu Ser Cys Val Glu Leu Ile Phe Asp Asp Asn Thr Ser Glu
 405 410 415
 Ile Ile Lys Glu Gln Leu Lys Tyr Leu Asp Asp Lys Lys Ile Tyr Asn
 420 425 430
 Val Lys Leu Glu Arg Gly Met Asn Ile Leu Ile Lys Val Pro Ser Tyr
 435 440 445
 Phe Thr Asn Phe Asp Glu Tyr Asn Asn Phe Pro Ala Ser Trp Ser Asn
 450 455 460
 Ile Asp Thr Lys Asn Gln Asp Gly Leu Gln Ser Val Ala Asn Lys Leu
 465 470 475 480
 Ser Gly Glu Thr Lys Ile Ile Ile Pro Met Ser Lys Leu Lys Pro Tyr
 485 490 495
 Lys Arg Tyr Val Phe Ser Gly Tyr Ser Lys Asp Pro Ser Thr Ser Asn
 500 505 510
 Ser Ile Thr Val Asn Ile Lys Ser Lys Glu Gln Lys Thr Asp Tyr Leu
 515 520 525
 Val Pro Glu Lys Asp Tyr Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr
 530 535 540
 Gly Lys Asp Ser Ser Asp Ile Glu Ile Thr Leu Thr Ser Ser Gly Val
 545 550 555 560
 Ile Phe Leu Asp Asn Leu Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu
 565 570 575
 Ile Leu Lys Glu Pro Glu Ile Lys Val Pro Ser Asp Gln Glu Ile Leu
 580 585 590
 Asp Ala His Asn Lys Tyr Tyr Ala Asp Ile Lys Leu Asp Thr Asn Thr
 595 600 605
 Gly Asn Thr Tyr Ile Asp Gly Ile Tyr Phe Glu Pro Thr Gln Thr Asn
 610 615 620
 Lys Glu Ala Leu Asp Tyr Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu
 625 630 635 640
 Gln Tyr Ser Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Ile Arg
 645 650 655
 Asn Tyr Leu Gly Asp Gln Asn Gln Pro Lys Thr Asn Tyr Ile Asn Phe
 660 665 670

Arg Ser Tyr Phe Thr Ser Gly Glu Asn Val Met Thr Tyr Lys Lys Leu
675 680 685
Arg Ile Tyr Ala Val Thr Pro Asp Asn Arg Glu Leu Leu Val Leu Ser
690 695 700
Val Asn
705

<210> 27
<211> 712
<212> PRT
<213> Clostridium spiroforme

<400> 27
Glu Leu Asn Gly Asp Lys Thr Leu Ile Pro Glu Lys Asn Leu Phe Leu
1 5 10 15
Arg Asp Tyr Ser Lys Ile Asp Glu Asn Asp Pro Phe Ile Pro Lys Asp
20 25 30
Asn Phe Phe Asp Leu Lys Leu Lys Ser Arg Ser Ala Arg Leu Ala Ser
35 40 45
Gly Trp Gly Asp Glu Asp Leu Asp Thr Asp Asn Asp Asn Ile Pro Asp
50 55 60
Ala Tyr Glu Lys Asn Gly Tyr Thr Ile Lys Asp Ser Ile Ala Val Lys
65 70 75 80
Trp Glu Asp Ser Phe Ala Gln Gln Gly Tyr Lys Lys Tyr Leu Ser Ser
85 90 95
Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr Asp Tyr Gln Lys
100 105 110
Ala Ser Gly Ser Phe Asp Lys Ala Ile Lys Ala Glu Ala Arg Asp Pro
115 120 125
Leu Val Ala Ala Tyr Pro Val Val Gly Val Gly Met Glu Lys Leu Ile
130 135 140
Ile Ser Thr Asn Glu His Ala Ser Thr Asp Gln Gly Lys Thr Val Ser
145 150 155 160
Arg Asn Thr Thr Asn Ser Lys Thr Asp Ala Asn Thr Ala Gly Val Ala
165 170 175
Ile Asn Ile Ala Tyr Gln Asn Gly Phe Thr Gly Ser Ile Thr Thr Asn
180 185 190
Tyr Ser His Thr Thr Glu Asn Ser Thr Ala Val Gln Asn Ser Asn Gly
195 200 205
Glu Ser Trp Asn Thr Ser Leu Ser Ile Asn Lys Gly Glu Ser Ala Tyr
210 215 220
Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr Ala Pro Met Tyr
225 230 235 240
Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly Asp Thr Leu Thr
245 250 255
Thr Ile Lys Ala Gln Asp Asn Gln Ile Gly Asn Asn Leu Ser Pro Asn
260 265 270
Glu Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala Leu Asn Thr Met
275 280 285
Asp Gln Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr Asp Gln Leu Lys
290 295 300
Lys Leu Asp Ala Gly Lys Gln Ile Lys Leu Glu Thr Thr Gln Val Ser
305 310 315 320
Gly Asn Tyr Gly Ile Lys Asn Ser Gln Gly Gln Ile Ile Thr Glu Gly
325 330 335
Asn Ser Trp Ser Asp Tyr Ile Ser Gln Ile Asp Ser Leu Ser Ala Ser
340 345 350
Ile Ile Leu Asp Thr Gly Ser Asp Val Phe Glu Arg Arg Val Thr Ala

355 360 365
 Lys Asp Ser Ser Asn Pro Glu Asp Lys Thr Pro Val Leu Thr Ile Gly
 370 375 380
 Glu Ala Ile Glu Lys Ala Phe Gly Ala Thr Lys Asn Gly Glu Ile Leu
 385 390 395 400
 Tyr Phe Asn Gly Met Pro Ile Asp Glu Ser Cys Val Glu Leu Ile Phe
 405 410 415
 Asp Gly Asn Thr Ala Asn Leu Ile Lys Glu Arg Leu Asn Ala Leu Asn
 420 425 430
 Asp Lys Lys Ile Tyr Asn Val Gln Leu Glu Arg Gly Met Lys Ile Leu
 435 440 445
 Ile Lys Thr Ser Thr Tyr Phe Asn Asn Phe Asp Gly Tyr Asn Asn Phe
 450 455 460
 Pro Ser Ser Trp Ser Asn Val Asp Ser Asn Asn Gln Asp Gly Leu Gln
 465 470 475 480
 Asn Ala Ala Asn Lys Leu Ser Gly Glu Thr Lys Ile Val Ile Pro Met
 485 490 495
 Ser Lys Leu Asn Pro Tyr Lys Arg Tyr Val Phe Ser Gly Tyr Leu Lys
 500 505 510
 Asn Ser Ser Thr Ser Asn Pro Ile Thr Val Asn Ile Lys Ala Lys Glu
 515 520 525
 Gln Lys Thr Tyr Asn Leu Val Ser Glu Asn Asp Tyr Lys Lys Phe Ser
 530 535 540
 Tyr Glu Phe Glu Thr Ile Gly Arg Asp Ala Ser Asn Ile Glu Ile Thr
 545 550 555 560
 Leu Thr Ser Ser Gly Thr Ile Phe Leu Asp Asn Leu Ser Ile Thr Glu
 565 570 575
 Leu Asn Ser Thr Pro Glu Ile Leu Lys Glu Pro Asp Ile Lys Val Pro
 580 585 590
 Ser Asp Gln Glu Ile Ile Asp Ala His Lys Lys Tyr Tyr Ala Asp Leu
 595 600 605
 Ser Phe Asn Gln Ser Thr Ala Asn Tyr Tyr Leu Asp Gly Leu Tyr Phe
 610 615 620
 Glu Pro Thr Gln Thr Asn Lys Glu Val Leu Asp Tyr Ile Gln Lys Tyr
 625 630 635 640
 Lys Val Glu Ala Thr Leu Glu Tyr Ser Gly Phe Lys Asp Ile Gly Thr
 645 650 655
 Lys Asp Lys Glu Leu Arg Asn Tyr Thr Gly Asp Ser Asn Gln Pro Lys
 660 665 670
 Thr Asn Tyr Val Asn Phe Arg Ser Tyr Phe Thr Ser Gly Glu Asn Val
 675 680 685
 Met Pro Tyr Lys Lys Leu Arg Ile Tyr Ala Ile Thr Pro Glu Asn Lys
 690 695 700
 Glu Leu Leu Val Leu Ser Ile Asn
 705 710

<210> 28
 <211> 582
 <212> PRT
 <213> Clostridium botulinum

<400> 28

Glu Thr Ser Asp Ile Ile Lys Glu Ile Ile Pro Ser Glu Val Leu Leu
 1 5 10 15
 Lys Pro Asn Tyr Ser Asn Thr Asn Glu Lys Ser Lys Phe Ile Pro Asn
 20 25 30
 Asn Thr Leu Phe Ser Asn Ala Lys Leu Lys Ala Asn Ala Asn Arg Asp
 35 40 45

Thr Asp Arg Asp Gly Ile Pro Asp Glu Trp Glu Ile Asn Gly Tyr Thr
 50 55 60
 Val Met Asn Gln Lys Ala Val Ala Trp Asp Asp Lys Phe Ala Ala Asn
 65 70 75 80
 Gly Tyr Lys Lys Tyr Val Ser Asn Pro Phe Lys Pro Cys Thr Ala Asn
 85 90 95
 Asp Pro Tyr Thr Asp Phe Glu Lys Val Ser Gly Gln Ile Asp Pro Ser
 100 105 110
 Val Ser Met Val Ala Arg Asp Pro Met Ile Ser Ala Tyr Pro Ile Val
 115 120 125
 Gly Val Gln Met Glu Arg Leu Val Val Ser Lys Ser Glu Thr Ile Thr
 130 135 140
 Gly Asp Ser Thr Lys Ser Met Ser Lys Ser Thr Ser His Ser Ser Thr
 145 150 155 160
 Asn Ile Asn Thr Val Gly Ala Glu Val Ser Gly Ser Leu Gln Leu Ala
 165 170 175
 Gly Gly Ile Phe Pro Val Phe Ser Met Ser Ala Ser Ala Asn Tyr Ser
 180 185 190
 His Thr Trp Gln Asn Thr Ser Thr Val Asp Asp Thr Thr Gly Glu Ser
 195 200 205
 Phe Ser Gln Gly Leu Ser Ile Asn Thr Gly Glu Ser Ala Tyr Ile Asn
 210 215 220
 Pro Asn Ile Arg Tyr Tyr Asn Thr Gly Thr Ala Pro Val Tyr Asn Val
 225 230 235 240
 Thr Pro Thr Thr Thr Ile Val Ile Asp Lys Gln Ser Val Ala Thr Ile
 245 250 255
 Lys Gly Gln Glu Ser Leu Ile Gly Asp Tyr Leu Asn Pro Gly Gly Thr
 260 265 270
 Tyr Pro Ile Ile Gly Glu Pro Pro Met Ala Leu Asn Thr Met Asp Gln
 275 280 285
 Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr Asn Gln Leu Lys Ser Ile
 290 295 300
 Asp Asn Gly Gly Thr Val Met Leu Ser Thr Ser Gln Phe Thr Gly Asn
 305 310 315 320
 Phe Ala Lys Tyr Asn Ser Asn Gly Asn Leu Val Thr Asp Gly Asn Asn
 325 330 335
 Trp Gly Pro Tyr Leu Gly Thr Ile Lys Ser Thr Thr Ala Ser Leu Thr
 340 345 350
 Leu Ser Phe Ser Gly Gln Thr Thr Gln Val Ala Val Val Ala Pro Asn
 355 360 365
 Phe Ser Asp Pro Glu Asp Lys Thr Pro Lys Leu Thr Leu Glu Gln Ala
 370 375 380
 Leu Val Lys Ala Phe Ala Leu Glu Lys Lys Asn Gly Lys Phe Tyr Phe
 385 390 395 400
 His Gly Leu Glu Ile Ser Lys Asn Glu Lys Ile Gln Val Phe Leu Asp
 405 410 415
 Ser Asn Thr Asn Asn Asp Phe Glu Asn Gln Leu Lys Asn Thr Ala Asp
 420 425 430
 Lys Asp Ile Met His Cys Ile Ile Lys Arg Asn Met Asn Ile Leu Val
 435 440 445
 Lys Val Ile Thr Phe Lys Glu Asn Ile Ser Ser Ile Asn Ile Ile Asn
 450 455 460
 Asp Thr Asn Phe Gly Val Gln Ser Met Thr Gly Leu Ser Asn Arg Ser
 465 470 475 480
 Lys Gly Gln Asp Gly Ile Tyr Arg Ala Ala Thr Thr Ala Phe Ser Phe
 485 490 495
 Lys Ser Lys Glu Leu Lys Tyr Pro Glu Gly Arg Tyr Arg Met Arg Phe
 500 505 510
 Val Ile Gln Ser Tyr Glu Pro Phe Thr Cys Asn Phe Lys Leu Phe Asn

	515		520		525										
Asn	Leu	Ile	Tyr	Ser	Ser	Ser	Phe	Asp	Lys	Gly	Tyr	Tyr	Asp	Glu	Phe
	530				535						540				
Phe	Tyr	Phe	Tyr	Tyr	Asn	Gly	Ser	Lys	Ser	Phe	Phe	Asn	Ile	Ser	Cys
545					550					555					560
Asp	Ile	Ile	Asn	Ser	Ile	Asn	Arg	Leu	Ser	Gly	Val	Phe	Leu	Ile	Glu
				565					570					575	
Leu	Asp	Lys	Leu	Ile	Ile										
			580												

<210> 29
 <211> 708
 <212> PRT
 <213> Bacillus cereus

C2

<400> 29															
Ile	Asp	Ser	Gln	Asn	Gln	Pro	Gln	Gln	Val	Gln	Gln	Asp	Glu	Leu	Arg
1				5					10					15	
Asn	Pro	Glu	Phe	Asn	Lys	Lys	Glu	Ser	Gln	Glu	Phe	Leu	Ala	Lys	Pro
			20				25						30		
Ser	Lys	Ile	Asn	Leu	Phe	Thr	Gln	Gln	Met	Lys	Arg	Glu	Ile	Asp	Glu
		35					40					45			
Asp	Thr	Asp	Thr	Asp	Gly	Asp	Ser	Ile	Pro	Asp	Leu	Trp	Glu	Glu	Asn
	50					55					60				
Gly	Tyr	Thr	Ile	Gln	Asn	Arg	Ile	Ala	Val	Lys	Trp	Asp	Asp	Ser	Leu
65				70						75					80
Ala	Ser	Lys	Gly	Tyr	Thr	Lys	Phe	Val	Ser	Asn	Pro	Leu	Glu	Ser	His
				85					90					95	
Thr	Val	Gly	Asp	Pro	Tyr	Thr	Asp	Tyr	Glu	Lys	Ala	Ala	Arg	Asp	Leu
			100					105					110		
Asp	Leu	Ser	Asn	Ala	Lys	Glu	Thr	Phe	Asn	Pro	Leu	Val	Ala	Ala	Phe
	115						120					125			
Pro	Ser	Val	Asn	Val	Ser	Met	Glu	Lys	Val	Ile	Leu	Ser	Pro	Asn	Glu
	130					135					140				
Asn	Leu	Ser	Asn	Ser	Val	Glu	Ser	His	Ser	Ser	Thr	Asn	Trp	Ser	Tyr
145					150					155					160
Thr	Asn	Thr	Glu	Gly	Ala	Ser	Val	Glu	Ala	Gly	Ile	Gly	Pro	Lys	Gly
				165					170					175	
Ile	Ser	Phe	Gly	Val	Ser	Val	Asn	Tyr	Gln	His	Ser	Glu	Thr	Val	Ala
			180					185					190		
Gln	Glu	Trp	Gly	Thr	Ser	Thr	Gly	Asn	Thr	Ser	Gln	Phe	Asn	Thr	Ala
	195						200					205			
Ser	Ala	Gly	Tyr	Leu	Asn	Ala	Asn	Val	Arg	Tyr	Asn	Asn	Val	Gly	Thr
	210					215					220				
Gly	Ala	Ile	Tyr	Asp	Val	Lys	Pro	Thr	Thr	Ser	Phe	Val	Leu	Asn	Asn
225					230					235					240
Asp	Thr	Ile	Ala	Thr	Ile	Thr	Ala	Lys	Ser	Asn	Ser	Thr	Ala	Leu	Asn
				245					250					255	
Ile	Ser	Pro	Gly	Glu	Ser	Tyr	Pro	Lys	Lys	Gly	Gln	Asn	Gly	Ile	Ala
			260					265					270		
Ile	Thr	Ser	Met	Asp	Asp	Phe	Asn	Ser	His	Pro	Ile	Thr	Leu	Asn	Lys
		275					280					285			
Lys	Gln	Val	Asp	Asn	Leu	Leu	Asn	Asn	Lys	Pro	Met	Met	Leu	Glu	Thr
	290					295					300				
Asn	Gln	Thr	Asp	Gly	Val	Tyr	Lys	Ile	Lys	Asp	Thr	His	Gly	Asn	Ile
305					310					315					320
Val	Thr	Gly	Gly	Glu	Trp	Asn	Gly	Val	Ile	Gln	Gln	Ile	Lys	Ala	Lys
				325					330					335	

Thr Ala Ser Ile Ile Val Asp Asp Gly Glu Arg Val Ala Glu Lys Arg
 340 345 350
 Val Ala Ala Lys Asp Tyr Glu Asn Pro Glu Asp Lys Thr Pro Ser Leu
 355 360 365
 Thr Leu Lys Asp Ala Leu Lys Leu Ser Tyr Pro Asp Glu Ile Lys Glu
 370 375 380
 Ile Glu Gly Leu Leu Tyr Tyr Lys Asn Lys Pro Ile Tyr Glu Ser Ser
 385 390 395 400
 Val Met Thr Tyr Leu Asp Glu Asn Thr Ala Lys Glu Val Thr Lys Gln
 405 410 415
 Leu Asn Asp Thr Thr Gly Lys Phe Lys Asp Val Ser His Leu Tyr Asp
 420 425 430
 Val Lys Leu Thr Pro Lys Met Asn Val Thr Ile Lys Leu Ser Ile Leu
 435 440 445
 Tyr Asp Asn Ala Glu Ser Asn Asp Asn Ser Ile Gly Lys Trp Thr Asn
 450 455 460
 Thr Asn Ile Val Ser Gly Gly Asn Asn Gly Lys Lys Gln Tyr Ser Ser
 465 470 475 480
 Asn Asn Pro Asp Ala Asn Leu Thr Leu Asn Thr Asp Ala Gln Glu Lys
 485 490 495
 Leu Asn Lys Asn Arg Asp Tyr Tyr Ile Ser Leu Tyr Met Lys Ser Glu
 500 505 510
 Lys Asn Thr Gln Cys Glu Ile Thr Ile Asp Gly Glu Ile Tyr Pro Ile
 515 520 525
 Thr Thr Lys Thr Val Asn Val Asn Lys Asp Asn Tyr Lys Arg Leu Asp
 530 535 540
 Ile Ile Ala His Asn Ile Lys Ser Asn Pro Ile Ser Ser Leu His Ile
 545 550 555 560
 Lys Thr Asn Asp Glu Ile Thr Leu Phe Trp Asp Asp Ile Ser Ile Thr
 565 570 575
 Asp Val Ala Ser Ile Lys Pro Glu Asn Leu Thr Asp Ser Glu Ile Lys
 580 585 590
 Gln Ile Tyr Ser Arg Tyr Gly Ile Lys Leu Glu Asp Gly Ile Leu Ile
 595 600 605
 Asp Lys Lys Gly Gly Ile His Tyr Gly Glu Phe Ile Asn Glu Ala Ser
 610 615 620
 Phe Asn Ile Glu Pro Leu Gln Asn Tyr Val Thr Lys Tyr Glu Val Thr
 625 630 635 640
 Tyr Ser Ser Glu Leu Gly Pro Asn Val Ser Asp Thr Leu Glu Ser Asp
 645 650 655
 Lys Ile Tyr Lys Asp Gly Thr Ile Lys Phe Asp Phe Thr Lys Tyr Ser
 660 665 670
 Lys Asn Glu Gln Gly Leu Phe Tyr Asp Ser Gly Leu Asn Trp Asp Phe
 675 680 685
 Lys Ile Asn Ala Ile Thr Tyr Asp Gly Lys Glu Met Asn Val Phe His
 690 695 700
 Arg Tyr Asn Lys
 705

<210> 30

<211> 735

<212> PRT

<213> Bacillus anthracis

<400> 30

Glu Val Lys Gln Glu Asn Arg Leu Leu Asn Glu Ser Glu Ser Ser Ser
 1 5 10 15
 Gln Gly Leu Leu Gly Tyr Tyr Phe Ser Asp Leu Asn Phe Gln Ala Pro

20 25 30
 Met Val Val Thr Ser Ser Thr Thr Gly Asp Leu Ser Ile Pro Ser Ser
 35 40 45
 Glu Leu Glu Asn Ile Pro Ser Glu Asn Gln Tyr Phe Gln Ser Ala Ile
 50 55 60
 Trp Ser Gly Phe Ile Lys Val Lys Lys Ser Asp Glu Tyr Thr Phe Ala
 65 70 75 80
 Thr Ser Ala Asp Asn His Val Thr Met Trp Val Asp Asp Gln Glu Val
 85 90 95
 Ile Asn Lys Ala Ser Asn Ser Asn Lys Ile Arg Leu Glu Lys Gly Arg
 100 105 110
 Leu Tyr Gln Ile Lys Ile Gln Tyr Gln Arg Glu Asn Pro Thr Glu Lys
 115 120 125
 Gly Leu Asp Phe Lys Leu Tyr Trp Thr Asp Ser Gln Asn Lys Lys Glu
 130 135 140
 Val Ile Ser Ser Asp Asn Leu Gln Leu Pro Glu Leu Lys Gln Lys Ser
 145 150 155 160
 Ser Asn Ser Arg Lys Lys Arg Ser Thr Ser Ala Gly Pro Thr Val Pro
 165 170 175
 Asp Arg Asp Asn Asp Gly Ile Pro Asp Ser Leu Glu Val Glu Gly Tyr
 180 185 190
 Thr Val Asp Val Lys Asn Lys Arg Thr Phe Leu Ser Pro Trp Ile Ser
 195 200 205
 Asn Ile His Glu Lys Lys Gly Leu Thr Lys Tyr Lys Ser Ser Pro Glu
 210 215 220
 Lys Trp Ser Thr Ala Ser Asp Pro Tyr Ser Asp Phe Glu Lys Val Thr
 225 230 235 240
 Gly Arg Ile Asp Lys Asn Val Ser Pro Glu Ala Arg His Pro Leu Val
 245 250 255
 Ala Ala Tyr Pro Ile Val His Val Asp Met Glu Asn Ile Ile Leu Ser
 260 265 270
 Lys Asn Glu Asp Gln Ser Thr Gln Asn Thr Asp Ser Gln Thr Arg Thr
 275 280 285
 Ile Ser Lys Asn Thr Ser Thr Ser Arg Thr His Thr Ser Glu Val His
 290 295 300
 Gly Asn Ala Glu Val His Ala Ser Phe Phe Asp Ile Gly Gly Ser Val
 305 310 315 320
 Ser Ala Gly Phe Ser Asn Ser Asn Ser Ser Thr Val Ala Ile Asp His
 325 330 335
 Ser Leu Ser Leu Ala Gly Glu Arg Thr Trp Ala Glu Thr Met Gly Leu
 340 345 350
 Asn Thr Ala Asp Thr Ala Arg Leu Asn Ala Asn Ile Arg Tyr Val Asn
 355 360 365
 Thr Gly Thr Ala Pro Ile Tyr Asn Val Leu Pro Thr Thr Ser Leu Val
 370 375 380
 Leu Gly Lys Asn Gln Thr Leu Ala Thr Ile Lys Ala Lys Glu Asn Gln
 385 390 395 400
 Leu Ser Gln Ile Leu Ala Pro Asn Asn Tyr Tyr Pro Ser Lys Asn Leu
 405 410 415
 Ala Pro Ile Ala Leu Asn Ala Gln Asp Asp Phe Ser Ser Thr Pro Ile
 420 425 430
 Thr Met Asn Tyr Asn Gln Phe Leu Glu Leu Glu Lys Thr Lys Gln Leu
 435 440 445
 Arg Leu Asp Thr Asp Gln Val Tyr Gly Asn Ile Ala Thr Tyr Asn Phe
 450 455 460
 Glu Asn Gly Arg Val Arg Val Asp Thr Gly Ser Asn Trp Ser Glu Val
 465 470 475 480
 Leu Pro Gln Ile Gln Glu Thr Thr Ala Arg Ile Ile Phe Asn Gly Lys
 485 490 495

Asp Leu Asn Leu Val Glu Arg Arg Ile Ala Ala Val Asn Pro Ser Asp
 500 505 510
 Pro Leu Glu Thr Thr Lys Pro Asp Met Thr Leu Lys Glu Ala Leu Lys
 515 520 525
 Ile Ala Phe Gly Phe Asn Glu Pro Asn Gly Asn Leu Gln Tyr Gln Gly
 530 535 540
 Lys Asp Ile Thr Glu Phe Asp Phe Asn Phe Asp Gln Gln Thr Ser Gln
 545 550 555 560
 Asn Ile Lys Asn Gln Leu Ala Glu Leu Asn Val Thr Asn Ile Tyr Thr
 565 570 575
 Val Leu Asp Lys Ile Lys Leu Asn Ala Lys Met Asn Ile Leu Ile Arg
 580 585 590
 Asp Lys Arg Phe His Tyr Asp Arg Asn Asn Ile Ala Val Gly Ala Asp
 595 600 605
 Glu Ser Val Val Lys Glu Ala His Arg Glu Val Ile Asn Ser Ser Thr
 610 615 620
 Glu Gly Leu Leu Leu Asn Ile Asp Lys Asp Ile Arg Lys Ile Leu Ser
 625 630 635 640
 Gly Tyr Ile Val Glu Ile Glu Asp Thr Glu Gly Leu Lys Glu Val Ile
 645 650 655
 Asn Asp Arg Tyr Asp Met Leu Asn Ile Ser Ser Leu Arg Gln Asp Gly
 660 665 670
 Lys Thr Phe Ile Asp Phe Lys Lys Tyr Asn Asp Lys Leu Pro Leu Tyr
 675 680 685
 Ile Ser Asn Pro Asn Tyr Lys Val Asn Val Tyr Ala Val Thr Lys Glu
 690 695 700
 Asn Thr Ile Ile Asn Pro Ser Glu Asn Gly Asp Thr Ser Thr Asn Gly
 705 710 715 720
 Ile Lys Lys Ile Leu Ile Phe Ser Lys Lys Gly Tyr Glu Ile Gly
 725 730 735

<210> 31
 <211> 876
 <212> PRT
 <213> Clostridium difficile

<400> 31
 Met Lys Ile Gln Met Arg Asn Lys Lys Val Leu Ser Phe Leu Thr Leu
 1 5 10 15
 Thr Ala Ile Val Ser Gln Ala Leu Val Tyr Pro Val Tyr Ala Gln Thr
 20 25 30
 Ser Thr Ser Asn His Ser Asn Lys Lys Glu Ile Val Asn Glu Asp
 35 40 45
 Ile Leu Pro Asn Asn Gly Leu Met Gly Tyr Tyr Phe Ser Asp Glu His
 50 55 60
 Phe Lys Asp Leu Lys Leu Met Ala Pro Ile Lys Asp Gly Asn Leu Lys
 65 70 75 80
 Phe Glu Glu Lys Lys Val Asp Lys Leu Leu Asp Lys Asp Lys Ser Asp
 85 90 95
 Val Lys Ser Ile Arg Trp Thr Gly Arg Ile Ile Pro Ser Lys Asp Gly
 100 105 110
 Glu Tyr Thr Leu Ser Thr Asp Arg Asp Val Leu Met Gln Val Asn
 115 120 125
 Thr Glu Ser Thr Ile Ser Asn Thr Leu Lys Val Asn Met Lys Lys Gly
 130 135 140
 Lys Glu Tyr Lys Val Arg Ile Glu Leu Gln Asp Lys Asn Leu Gly Ser
 145 150 155 160
 Ile Asp Asn Leu Ser Ser Pro Asn Leu Tyr Trp Glu Leu Asp Gly Met

165 170 175
 Lys Lys Ile Ile Pro Glu Glu Asn Leu Phe Leu Arg Asp Tyr Ser Asn
 180 185 190
 Ile Glu Lys Asp Asp Pro Phe Ile Pro Asn Asn Asn Phe Phe Asp Pro
 195 200 205
 Lys Leu Met Ser Asp Trp Glu Asp Glu Asp Leu Asp Thr Asp Asn Asp
 210 215 220
 Asn Ile Pro Asp Ser Tyr Glu Arg Asn Gly Tyr Thr Ile Lys Asp Leu
 225 230 235 240
 Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Glu Gln Gly Tyr Lys Lys
 245 250 255
 Tyr Val Ser Asn Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr
 260 265 270
 Asp Tyr Glu Lys Ala Ser Gly Ser Phe Asp Lys Ala Ile Lys Thr Glu
 275 280 285
 Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Ile Val Gly Val Gly Met
 290 295 300
 Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala Ser Thr Asp Gln Gly
 305 310 315 320
 Lys Thr Val Ser Arg Ala Thr Thr Asn Ser Lys Thr Glu Ser Asn Thr
 325 330 335
 Ala Gly Val Ser Val Asn Val Gly Tyr Gln Asn Gly Phe Thr Ala Asn
 340 345 350
 Val Thr Thr Asn Tyr Ser His Thr Thr Asp Asn Ser Thr Ala Val Gln
 355 360 365
 Asp Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu Ser Ile Asn Lys Gly
 370 375 380
 Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr
 385 390 395 400
 Ala Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly
 405 410 415
 Asp Thr Leu Ser Thr Ile Lys Ala Gln Glu Asn Gln Ile Gly Asn Asn
 420 425 430
 Leu Ser Pro Gly Asp Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala
 435 440 445
 Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu Ile Pro Ile Asn Tyr
 450 455 460
 Asp Gln Leu Lys Lys Leu Asp Ala Gly Lys Gln Ile Lys Leu Glu Thr
 465 470 475 480
 Thr Gln Val Ser Gly Asn Phe Gly Thr Lys Asn Ser Ser Gly Gln Ile
 485 490 495
 Val Thr Glu Gly Asn Ser Trp Ser Asp Tyr Ile Ser Gln Ile Asp Ser
 500 505 510
 Ile Ser Ala Ser Ile Ile Leu Asp Thr Glu Asn Glu Ser Tyr Glu Arg
 515 520 525
 Arg Val Thr Ala Lys Asn Leu Gln Asp Pro Glu Asp Lys Thr Pro Glu
 530 535 540
 Leu Thr Ile Gly Glu Ala Ile Glu Lys Ala Phe Gly Ala Thr Lys Lys
 545 550 555 560
 Asp Gly Leu Leu Tyr Phe Asn Asp Ile Pro Ile Asp Glu Ser Cys Val
 565 570 575
 Glu Leu Ile Phe Asp Asp Asn Thr Ala Asn Lys Ile Lys Asp Ser Leu
 580 585 590
 Lys Thr Leu Ser Asp Lys Lys Ile Tyr Asn Val Lys Leu Glu Arg Gly
 595 600 605
 Met Asn Ile Leu Ile Lys Thr Pro Thr Tyr Phe Thr Asn Phe Asp Asp
 610 615 620
 Tyr Asn Asn Tyr Pro Ser Thr Trp Ser Asn Val Asn Thr Thr Asn Gln
 625 630 635 640

Asp Gly Leu Gln Gly Ser Ala Asn Lys Leu Asn Gly Glu Thr Lys Ile
 645 650 655
 Lys Ile Pro Met Ser Glu Leu Lys Pro Tyr Lys Arg Tyr Val Phe Ser
 660 665 670
 Gly Tyr Ser Lys Asp Pro Leu Thr Ser Asn Ser Ile Ile Val Lys Ile
 675 680 685
 Lys Ala Lys Glu Glu Lys Thr Asp Tyr Leu Val Pro Glu Gln Gly Tyr
 690 695 700
 Thr Lys Phe Ser Tyr Glu Phe Glu Thr Thr Glu Lys Asp Ser Ser Asn
 705 710 715 720
 Ile Glu Ile Thr Leu Ile Gly Ser Gly Thr Thr Tyr Leu Asp Asn Leu
 725 730 735
 Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Asp Glu Pro Glu
 740 745 750
 Val Lys Ile Pro Thr Asp Gln Glu Ile Met Asp Ala His Lys Ile Tyr
 755 760 765
 Phe Ala Asp Leu Asn Phe Asn Pro Ser Thr Gly Asn Thr Tyr Ile Asn
 770 775 780
 Gly Met Tyr Phe Ala Pro Thr Gln Thr Asn Lys Glu Ala Leu Asp Tyr
 785 790 795 800
 Ile Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln Tyr Ser Gly Phe Lys
 805 810 815
 Asp Ile Gly Thr Lys Asp Lys Glu Met Arg Asn Tyr Leu Gly Asp Pro
 820 825 830
 Asn Gln Pro Lys Thr Asn Tyr Val Asn Leu Arg Ser Tyr Phe Thr Gly
 835 840 845
 Gly Glu Asn Ile Met Thr Tyr Lys Lys Leu Arg Ile Tyr Ala Ile Thr
 850 855 860
 Pro Asp Asp Arg Glu Leu Leu Val Leu Ser Val Asp
 865 870 875

<210> 32
 <211> 875
 <212> PRT
 <213> Clostridium perfringens

<400> 32
 Met Asn Ile Gln Ile Lys Asn Val Phe Ser Phe Leu Thr Leu Thr Ala
 1 5 10 15
 Met Ile Ser Gln Thr Leu Ser Tyr Asn Val Tyr Ala Gln Thr Thr Thr
 20 25 30
 Gln Asn Asp Thr Asn Gln Lys Glu Ile Thr Asn Glu Asn Thr Leu
 35 40 45
 Ser Ser Asn Gly Leu Met Gly Tyr Tyr Phe Ala Asp Glu His Phe Lys
 50 55 60
 Asp Leu Glu Leu Met Ala Pro Ile Lys Asn Gly Asp Leu Lys Phe Glu
 65 70 75 80
 Glu Lys Lys Val Asp Lys Leu Leu Thr Glu Asp Asn Ser Ser Ile Lys
 85 90 95
 Ser Ile Arg Trp Thr Gly Arg Ile Ile Pro Ser Glu Asp Gly Glu Tyr
 100 105 110
 Ile Leu Ser Thr Asp Arg Asn Asp Val Leu Met Gln Ile Asn Ala Lys
 115 120 125
 Gly Asp Ile Ala Lys Thr Leu Lys Val Asn Met Lys Lys Gly Gln Ala
 130 135 140
 Tyr Asn Ile Arg Ile Glu Ile Gln Asp Lys Asn Leu Gly Ser Ile Asp
 145 150 155 160
 Asn Leu Ser Val Pro Lys Leu Tyr Trp Glu Leu Asn Gly Asn Lys Thr

165 170 175
 Val Ile Pro Glu Glu Asn Leu Phe Phe Arg Asp Tyr Ser Lys Ile Asp
 180 185 190
 Glu Asn Asp Pro Phe Ile Pro Asn Asn Asn Phe Phe Asp Val Arg Phe
 195 200 205
 Phe Ser Ala Ala Trp Glu Asp Glu Asp Leu Asp Thr Asp Asn Asp Asn
 210 215 220
 Ile Pro Asp Ala Tyr Glu Lys Asn Gly Tyr Thr Ile Lys Asp Ser Ile
 225 230 235 240
 Ala Val Lys Trp Asn Asp Ser Phe Ala Glu Gln Gly Tyr Lys Lys Tyr
 245 250 255
 Val Ser Ser Tyr Leu Glu Ser Asn Thr Ala Gly Asp Pro Tyr Thr Asp
 260 265 270
 Tyr Gln Lys Ala Ser Gly Ser Ile Asp Lys Ala Ile Lys Leu Glu Ala
 275 280 285
 Arg Asp Pro Leu Val Ala Ala Tyr Pro Val Val Gly Val Gly Met Glu
 290 295 300
 Asn Leu Ile Ile Ser Thr Asn Glu His Ala Ser Ser Asp Gln Gly Lys
 305 310 315 320
 Thr Val Ser Arg Ala Thr Thr Asn Ser Lys Thr Asp Ala Asn Thr Val
 325 330 335
 Gly Val Ser Ile Ser Ala Gly Tyr Gln Asn Gly Phe Thr Gly Asn Ile
 340 345 350
 Thr Thr Ser Tyr Ser His Thr Thr Asp Asn Ser Thr Ala Val Gln Asp
 355 360 365
 Ser Asn Gly Glu Ser Trp Asn Thr Gly Leu Ser Ile Asn Lys Gly Glu
 370 375 380
 Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn Thr Gly Thr Ala
 385 390 395 400
 Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val Leu Asp Gly Glu
 405 410 415
 Thr Leu Ala Thr Ile Lys Ala Gln Asp Asn Gln Ile Gly Asn Asn Leu
 420 425 430
 Ser Pro Asn Glu Thr Tyr Pro Lys Lys Gly Leu Ser Pro Leu Ala Leu
 435 440 445
 Asn Thr Met Asp Gln Phe Asn Ala Arg Leu Ile Pro Ile Asn Tyr Asp
 450 455 460
 Gln Leu Lys Lys Leu Asp Ser Gly Lys Gln Ile Lys Leu Glu Thr Thr
 465 470 475 480
 Gln Val Ser Gly Asn Tyr Gly Thr Lys Asn Ser Gln Gly Gln Ile Ile
 485 490 495
 Thr Glu Gly Asn Ser Trp Ser Asn Tyr Ile Ser Gln Ile Asp Ser Val
 500 505 510
 Ser Ala Ser Ile Ile Leu Asp Thr Gly Ser Gln Thr Phe Glu Arg Arg
 515 520 525
 Val Ala Ala Lys Glu Gln Gly Asn Pro Glu Asp Lys Thr Pro Glu Ile
 530 535 540
 Thr Ile Gly Glu Ala Ile Lys Lys Ala Phe Ser Ala Thr Lys Asn Gly
 545 550 555 560
 Glu Leu Leu Tyr Phe Asn Gly Ile Pro Ile Asp Glu Ser Cys Val Glu
 565 570 575
 Leu Ile Phe Asp Asp Asn Thr Ser Glu Ile Ile Lys Glu Gln Leu Lys
 580 585 590
 Tyr Leu Asp Asp Lys Lys Ile Tyr Asn Val Lys Leu Glu Arg Gly Met
 595 600 605
 Asn Ile Leu Ile Lys Val Pro Ser Tyr Phe Thr Asn Phe Asp Glu Tyr
 610 615 620
 Asn Asn Phe Pro Ala Ser Trp Ser Asn Ile Asp Thr Lys Asn Gln Asp
 625 630 635 640

Gly Leu Gln Ser Val Ala Asn Lys Leu Ser Gly Glu Thr Lys Ile Ile
 645 650 655
 Ile Pro Met Ser Lys Leu Lys Pro Tyr Lys Arg Tyr Val Phe Ser Gly
 660 665 670
 Tyr Ser Lys Asp Pro Ser Thr Ser Asn Ser Ile Thr Val Asn Ile Lys
 675 680 685
 Ser Lys Glu Gln Lys Thr Asp Tyr Leu Val Pro Glu Lys Asp Tyr Thr
 690 695 700
 Lys Phe Ser Tyr Glu Phe Glu Thr Thr Gly Lys Asp Ser Ser Asp Ile
 705 710 715 720
 Glu Ile Thr Leu Thr Ser Ser Gly Val Ile Phe Leu Asp Asn Leu Ser
 725 730 735
 Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Lys Glu Pro Glu Ile
 740 745 750
 Lys Val Pro Ser Asp Gln Glu Ile Leu Asp Ala His Asn Lys Tyr Tyr
 755 760 765
 Ala Asp Ile Lys Leu Asp Thr Asn Thr Gly Asn Thr Tyr Ile Asp Gly
 770 775 780
 Ile Tyr Phe Glu Pro Thr Gln Thr Asn Lys Glu Ala Leu Asp Tyr Ile
 785 790 795 800
 Gln Lys Tyr Arg Val Glu Ala Thr Leu Gln Tyr Ser Gly Phe Lys Asp
 805 810 815
 Ile Gly Thr Lys Asp Lys Glu Ile Arg Asn Tyr Leu Gly Asp Gln Asn
 820 825 830
 Gln Pro Lys Thr Asn Tyr Ile Asn Phe Arg Ser Tyr Phe Thr Ser Gly
 835 840 845
 Glu Asn Val Met Thr Tyr Lys Lys Leu Arg Ile Tyr Ala Val Thr Pro
 850 855 860
 Asp Asn Arg Glu Leu Leu Val Leu Ser Val Asn
 865 870 875

<210> 33
 <211> 879
 <212> PRT
 <213> Clostridium spiroforme

<400> 33
 Met Lys Asn Lys Lys Ile Leu Gly Leu Leu Thr Cys Thr Val Leu Val
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 Gly Gln Met Met Thr Tyr Pro Val Tyr Ala Lys Thr Ile Thr Gln Asn
 20 25 30
 Tyr Asp Asn Gln Glu Val Glu Thr Thr Asn Glu Lys Thr Val Ser Ser
 35 40 45
 Asn Gly Leu Met Gly Tyr Tyr Phe Ala Asp Glu His Phe Lys Asp Leu
 50 55 60
 Glu Leu Met Ala Pro Val Lys Asn Gly Glu Leu Lys Phe Glu Lys Asn
 65 70 75 80
 Lys Val Glu Lys Leu Leu Thr Glu Glu Lys Thr Asn Ile Lys Ser Ile
 85 90 95
 Arg Trp Thr Gly Arg Ile Ile Pro Ser Lys Asp Gly Glu Tyr Thr Leu
 100 105 110
 Ser Thr Asp Lys Asp Asn Val Leu Met Gln Ile Asn Ala Glu Gly Glu
 115 120 125
 Ile Ala Asn Thr Leu Lys Val Asn Met Ile Lys Gly Gln Glu Tyr Ser
 130 135 140
 Ile Arg Ile Glu Ile Gln Asp Lys Asp Ile Gly Tyr Val Asp Asp Leu
 145 150 155 160
 Ser Ser Pro Lys Leu Tyr Trp Glu Leu Asn Gly Asp Lys Thr Leu Ile

165 170 175
 Pro Glu Lys Asn Leu Phe Leu Arg Asp Tyr Ser Lys Ile Asp Glu Asn
 180 185 190
 Asp Pro Phe Ile Pro Lys Asp Asn Phe Phe Asp Leu Lys Leu Lys Ser
 195 200 205
 Arg Ser Ala Arg Leu Ala Ser Gly Trp Gly Asp Glu Asp Leu Asp Thr
 210 215 220
 Asp Asn Asp Asn Ile Pro Asp Ala Tyr Glu Lys Asn Gly Tyr Thr Ile
 225 230 235 240
 Lys Asp Ser Ile Ala Val Lys Trp Glu Asp Ser Phe Ala Gln Gln Gly
 245 250 255
 Tyr Lys Lys Tyr Leu Ser Ser Tyr Leu Glu Ser Asn Thr Ala Gly Asp
 260 265 270
 Pro Tyr Thr Asp Tyr Gln Lys Ala Ser Gly Ser Phe Asp Lys Ala Ile
 275 280 285
 Lys Ala Glu Ala Arg Asp Pro Leu Val Ala Ala Tyr Pro Val Val Gly
 290 295 300
 Val Gly Met Glu Lys Leu Ile Ile Ser Thr Asn Glu His Ala Ser Thr
 305 310 315 320
 Asp Gln Gly Lys Thr Val Ser Arg Asn Thr Thr Asn Ser Lys Thr Asp
 325 330 335
 Ala Asn Thr Ala Gly Val Ala Ile Asn Ile Ala Tyr Gln Asn Gly Phe
 340 345 350
 Thr Gly Ser Ile Thr Thr Asn Tyr Ser His Thr Thr Glu Asn Ser Thr
 355 360 365
 Ala Val Gln Asn Ser Asn Gly Glu Ser Trp Asn Thr Ser Leu Ser Ile
 370 375 380
 Asn Lys Gly Glu Ser Ala Tyr Ile Asn Ala Asn Val Arg Tyr Tyr Asn
 385 390 395 400
 Thr Gly Thr Ala Pro Met Tyr Lys Val Thr Pro Thr Thr Asn Leu Val
 405 410 415
 Leu Asp Gly Asp Thr Leu Thr Thr Ile Lys Ala Gln Asp Asn Gln Ile
 420 425 430
 Gly Asn Asn Leu Ser Pro Asn Glu Thr Tyr Pro Lys Lys Gly Leu Ser
 435 440 445
 Pro Leu Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu Ile Pro
 450 455 460
 Ile Asn Tyr Asp Gln Leu Lys Lys Leu Asp Ala Gly Lys Gln Ile Lys
 465 470 475 480
 Leu Glu Thr Thr Gln Val Ser Gly Asn Tyr Gly Ile Lys Asn Ser Gln
 485 490 495
 Gly Gln Ile Ile Thr Glu Gly Asn Ser Trp Ser Asp Tyr Ile Ser Gln
 500 505 510
 Ile Asp Ser Leu Ser Ala Ser Ile Ile Leu Asp Thr Gly Ser Asp Val
 515 520 525
 Phe Glu Arg Arg Val Thr Ala Lys Asp Ser Ser Asn Pro Glu Asp Lys
 530 535 540
 Thr Pro Val Leu Thr Ile Gly Glu Ala Ile Glu Lys Ala Phe Gly Ala
 545 550 555 560
 Thr Lys Asn Gly Glu Ile Leu Tyr Phe Asn Gly Met Pro Ile Asp Glu
 565 570 575
 Ser Cys Val Glu Leu Ile Phe Asp Gly Asn Thr Ala Asn Leu Ile Lys
 580 585 590
 Glu Arg Leu Asn Ala Leu Asn Asp Lys Lys Ile Tyr Asn Val Gln Leu
 595 600 605
 Glu Arg Gly Met Lys Ile Leu Ile Lys Thr Ser Thr Tyr Phe Asn Asn
 610 615 620
 Phe Asp Gly Tyr Asn Asn Phe Pro Ser Ser Trp Ser Asn Val Asp Ser
 625 630 635 640

Asn Asn Gln Asp Gly Leu Gln Asn Ala Ala Asn Lys Leu Ser Gly Glu
 645 650 655
 Thr Lys Ile Val Ile Pro Met Ser Lys Leu Asn Pro Tyr Lys Arg Tyr
 660 665 670
 Val Phe Ser Gly Tyr Leu Lys Asn Ser Ser Thr Ser Asn Pro Ile Thr
 675 680 685
 Val Asn Ile Lys Ala Lys Glu Gln Lys Thr Tyr Asn Leu Val Ser Glu
 690 695 700
 Asn Asp Tyr Lys Lys Phe Ser Tyr Glu Phe Glu Thr Ile Gly Arg Asp
 705 710 715 720
 Ala Ser Asn Ile Glu Ile Thr Leu Thr Ser Ser Gly Thr Ile Phe Leu
 725 730 735
 Asp Asn Leu Ser Ile Thr Glu Leu Asn Ser Thr Pro Glu Ile Leu Lys
 740 745 750
 Glu Pro Asp Ile Lys Val Pro Ser Asp Gln Glu Ile Ile Asp Ala His
 755 760 765
 Lys Lys Tyr Tyr Ala Asp Leu Ser Phe Asn Gln Ser Thr Ala Asn Tyr
 770 775 780
 Tyr Leu Asp Gly Leu Tyr Phe Glu Pro Thr Gln Thr Asn Lys Glu Val
 785 790 795 800
 Leu Asp Tyr Ile Gln Lys Tyr Lys Val Glu Ala Thr Leu Glu Tyr Ser
 805 810 815
 Gly Phe Lys Asp Ile Gly Thr Lys Asp Lys Glu Leu Arg Asn Tyr Thr
 820 825 830
 Gly Asp Ser Asn Gln Pro Lys Thr Asn Tyr Val Asn Phe Arg Ser Tyr
 835 840 845
 Phe Thr Ser Gly Glu Asn Val Met Pro Tyr Lys Lys Leu Arg Ile Tyr
 850 855 860
 Ala Ile Thr Pro Glu Asn Lys Glu Leu Leu Val Leu Ser Ile Asn
 865 870 875

<210> 34
 <211> 721
 <212> PRT
 <213> Clostridium botulinum

<400> 34
 Met Leu Val Ser Lys Phe Glu Asn Ser Val Lys Asn Ser Asn Lys Asn
 1 5 10 15
 Tyr Phe Thr Ile Asn Gly Leu Met Gly Tyr Tyr Phe Glu Asn Asp Phe
 20 25 30
 Phe Asn Leu Asn Ile Ile Ser Pro Thr Leu Asp Gly Asn Leu Thr Phe
 35 40 45
 Ser Lys Glu Asp Ile Asn Ser Ile Leu Gly Asn Lys Ile Ile Lys Ser
 50 55 60
 Ala Arg Trp Ile Gly Leu Ile Lys Pro Ser Ile Thr Gly Glu Tyr Ile
 65 70 75 80
 Leu Ser Thr Asn Ser Pro Asn Cys Arg Val Glu Leu Asn Gly Glu Ile
 85 90 95
 Phe Asn Leu Ser Leu Asn Thr Ser Asn Thr Val Asn Leu Ile Gln Gly
 100 105 110
 Asn Val Tyr Asp Ile Arg Ile Glu Gln Leu Met Ser Glu Asn Gln Leu
 115 120 125
 Leu Lys Asn Tyr Glu Gly Ile Lys Leu Tyr Trp Glu Thr Ser Asp Ile
 130 135 140
 Ile Lys Glu Ile Ile Pro Ser Glu Val Leu Leu Lys Pro Asn Tyr Ser
 145 150 155 160
 Asn Thr Asn Glu Lys Ser Lys Phe Ile Pro Asn Asn Thr Leu Phe Ser

165 170 175
 Asn Ala Lys Leu Lys Ala Asn Ala Asn Arg Asp Thr Asp Arg Asp Gly
 180 185 190
 Ile Pro Asp Glu Trp Glu Ile Asn Gly Tyr Thr Val Met Asn Gln Lys
 195 200 205
 Ala Val Ala Trp Asp Asp Lys Phe Ala Ala Asn Gly Tyr Lys Lys Tyr
 210 215 220
 Val Ser Asn Pro Phe Lys Pro Cys Thr Ala Asn Asp Pro Tyr Thr Asp
 225 230 235 240
 Phe Glu Lys Val Ser Gly Gln Ile Asp Pro Ser Val Ser Met Val Ala
 245 250 255
 Arg Asp Pro Met Ile Ser Ala Tyr Pro Ile Val Gly Val Gln Met Glu
 260 265 270
 Arg Leu Val Val Ser Lys Ser Glu Thr Ile Thr Gly Asp Ser Thr Lys
 275 280 285
 Ser Met Ser Lys Ser Thr Ser His Ser Ser Thr Asn Ile Asn Thr Val
 290 295 300
 Gly Ala Glu Val Ser Gly Ser Leu Gln Leu Ala Gly Gly Ile Phe Pro
 305 310 315 320
 Val Phe Ser Met Ser Ala Ser Ala Asn Tyr Ser His Thr Trp Gln Asn
 325 330 335
 Thr Ser Thr Val Asp Asp Thr Thr Gly Glu Ser Phe Ser Gln Gly Leu
 340 345 350
 Ser Ile Asn Thr Gly Glu Ser Ala Tyr Ile Asn Pro Asn Ile Arg Tyr
 355 360 365
 Tyr Asn Thr Gly Thr Ala Pro Val Tyr Asn Val Thr Pro Thr Thr Thr
 370 375 380
 Ile Val Ile Asp Lys Gln Ser Val Ala Thr Ile Lys Gly Gln Glu Ser
 385 390 395 400
 Leu Ile Gly Asp Tyr Leu Asn Pro Gly Gly Thr Tyr Pro Ile Ile Gly
 405 410 415
 Glu Pro Pro Met Ala Leu Asn Thr Met Asp Gln Phe Ser Ser Arg Leu
 420 425 430
 Ile Pro Ile Asn Tyr Asn Gln Leu Lys Ser Ile Asp Asn Gly Gly Thr
 435 440 445
 Val Met Leu Ser Thr Ser Gln Phe Thr Gly Asn Phe Ala Lys Tyr Asn
 450 455 460
 Ser Asn Gly Asn Leu Val Thr Asp Gly Asn Asn Trp Gly Pro Tyr Leu
 465 470 475 480
 Gly Thr Ile Lys Ser Thr Thr Ala Ser Leu Thr Leu Ser Phe Ser Gly
 485 490 495
 Gln Thr Thr Gln Val Ala Val Val Ala Pro Asn Phe Ser Asp Pro Glu
 500 505 510
 Asp Lys Thr Pro Lys Leu Thr Leu Glu Gln Ala Leu Val Lys Ala Phe
 515 520 525
 Ala Leu Glu Lys Lys Asn Gly Lys Phe Tyr Phe His Gly Leu Glu Ile
 530 535 540
 Ser Lys Asn Glu Lys Ile Gln Val Phe Leu Asp Ser Asn Thr Asn Asn
 545 550 555 560
 Asp Phe Glu Asn Gln Leu Lys Asn Thr Ala Asp Lys Asp Ile Met His
 565 570 575
 Cys Ile Ile Lys Arg Asn Met Asn Ile Leu Val Lys Val Ile Thr Phe
 580 585 590
 Lys Glu Asn Ile Ser Ser Ile Asn Ile Ile Asn Asp Thr Asn Phe Gly
 595 600 605
 Val Gln Ser Met Thr Gly Leu Ser Asn Arg Ser Lys Gly Gln Asp Gly
 610 615 620
 Ile Tyr Arg Ala Ala Thr Thr Ala Phe Ser Phe Lys Ser Lys Glu Leu
 625 630 635 640

Lys Tyr Pro Glu Gly Arg Tyr Arg Met Arg Phe Val Ile Gln Ser Tyr
 645 650 655
 Glu Pro Phe Thr Cys Asn Phe Lys Leu Phe Asn Asn Leu Ile Tyr Ser
 660 665 670
 Ser Ser Phe Asp Lys Gly Tyr Tyr Asp Glu Phe Phe Tyr Phe Tyr Tyr
 675 680 685
 Asn Gly Ser Lys Ser Phe Phe Asn Ile Ser Cys Asp Ile Ile Asn Ser
 690 695 700
 Ile Asn Arg Leu Ser Gly Val Phe Leu Ile Glu Leu Asp Lys Leu Ile
 705 710 715 720
 Ile

<210> 35
 <211> 1338
 <212> PRT
 <213> Bacillus cereus

<400> 35
 Met Lys Arg Met Glu Gly Lys Leu Phe Met Val Ser Lys Lys Leu Gln
 1 5 10 15
 Val Val Thr Lys Thr Val Leu Leu Ser Thr Val Phe Ser Ile Ser Leu
 20 25 30
 Leu Asn Asn Glu Val Ile Lys Ala Glu Gln Leu Asn Ile Asn Ser Gln
 35 40 45
 Ser Lys Tyr Thr Asn Leu Gln Asn Leu Lys Ile Thr Asp Lys Val Glu
 50 55 60
 Asp Phe Lys Glu Asp Lys Glu Lys Ala Lys Glu Trp Gly Lys Glu Lys
 65 70 75 80
 Glu Lys Glu Trp Lys Leu Thr Ala Thr Glu Lys Gly Lys Met Asn Asn
 85 90 95
 Phe Leu Asp Asn Lys Asn Asp Ile Lys Thr Asn Tyr Lys Glu Ile Thr
 100 105 110
 Phe Ser Ile Ala Gly Ser Phe Glu Asp Glu Ile Lys Asp Leu Lys Glu
 115 120 125
 Ile Asp Lys Met Phe Asp Lys Thr Asn Leu Ser Asn Ser Ile Ile Thr
 130 135 140
 Tyr Lys Asn Val Glu Pro Thr Thr Ile Gly Phe Asn Lys Ser Leu Thr
 145 150 155 160
 Glu Gly Asn Thr Ile Asn Ser Asp Ala Met Ala Gln Phe Lys Glu Gln
 165 170 175
 Phe Leu Asp Arg Asp Ile Lys Phe Asp Ser Tyr Leu Asp Thr His Leu
 180 185 190
 Thr Ala Gln Gln Val Ser Ser Lys Glu Arg Val Ile Leu Lys Val Thr
 195 200 205
 Val Pro Ser Gly Lys Gly Ser Thr Thr Pro Thr Lys Ala Gly Val Ile
 210 215 220
 Leu Asn Asn Ser Glu Tyr Lys Met Leu Ile Asp Asn Gly Tyr Met Val
 225 230 235 240
 His Val Asp Lys Val Ser Lys Val Val Lys Lys Gly Val Glu Cys Leu
 245 250 255
 Gln Ile Glu Gly Thr Leu Lys Lys Ser Leu Asp Phe Lys Asn Asp Ile
 260 265 270
 Asn Ala Glu Ala His Ser Trp Gly Met Lys Asn Tyr Glu Glu Trp Ala
 275 280 285
 Lys Asp Leu Thr Asp Ser Gln Arg Glu Ala Leu Asp Gly Tyr Ala Arg
 290 295 300
 Gln Asp Tyr Lys Glu Ile Asn Asn Tyr Leu Arg Asn Gln Gly Gly Ser

305 310 315 320
 Gly Asn Glu Lys Leu Asp Ala Gln Ile Lys Asn Ile Ser Asp Ala Leu
 325 330 335
 Gly Lys Lys Pro Ile Pro Glu Asn Ile Thr Val Tyr Arg Trp Cys Gly
 340 345 350
 Met Pro Glu Phe Gly Tyr Gln Ile Ser Asp Pro Leu Pro Ser Leu Lys
 355 360 365
 Asp Phe Glu Glu Gln Phe Leu Asn Thr Ile Lys Glu Asp Lys Gly Tyr
 370 375 380
 Met Ser Thr Ser Leu Ser Ser Glu Arg Leu Ala Ala Phe Gly Ser Arg
 385 390 395 400
 Lys Ile Ile Leu Arg Leu Gln Val Pro Lys Gly Ser Thr Gly Ala Tyr
 405 410 415
 Leu Ser Ala Ile Gly Gly Phe Ala Ser Glu Lys Glu Ile Leu Leu Asp
 420 425 430
 Lys Asp Ser Lys Tyr His Ile Asp Lys Val Thr Glu Val Ile Ile Lys
 435 440 445
 Gly Val Lys Arg Tyr Val Val Asp Ala Thr Leu Leu Thr Asn Ser Arg
 450 455 460
 Gly Pro Ser Thr Pro Pro Thr Pro Ser Pro Ser Thr Pro Pro Thr Pro
 465 470 475 480
 Ser Asp Ile Gly Ser Thr Met Lys Thr Asn Gln Ile Ser Thr Thr Gln
 485 490 495
 Lys Asn Gln Gln Lys Glu Met Asp Arg Lys Gly Leu Leu Gly Tyr Tyr
 500 505 510
 Phe Lys Gly Lys Asp Phe Ser Asn Leu Thr Met Phe Ala Pro Thr Arg
 515 520 525
 Asp Ser Thr Leu Ile Tyr Asp Gln Gln Thr Ala Asn Lys Leu Leu Asp
 530 535 540
 Lys Lys Gln Gln Glu Tyr Gln Ser Ile Arg Trp Ile Gly Leu Ile Gln
 545 550 555 560
 Ser Lys Glu Thr Gly Asp Phe Thr Phe Asn Leu Ser Glu Asp Glu Gln
 565 570 575
 Ala Ile Ile Glu Ile Asn Gly Lys Ile Ile Ser Asn Lys Gly Lys Glu
 580 585 590
 Lys Gln Val Val His Leu Glu Lys Gly Lys Leu Val Pro Ile Lys Ile
 595 600 605
 Glu Tyr Gln Ser Asp Thr Lys Phe Asn Ile Asp Ser Lys Thr Phe Lys
 610 615 620
 Glu Leu Lys Leu Phe Lys Ile Asp Ser Gln Asn Gln Pro Gln Gln Val
 625 630 635 640
 Gln Gln Asp Glu Leu Arg Asn Pro Glu Phe Asn Lys Lys Glu Ser Gln
 645 650 655
 Glu Phe Leu Ala Lys Pro Ser Lys Ile Asn Leu Phe Thr Gln Gln Met
 660 665 670
 Lys Arg Glu Ile Asp Glu Asp Thr Asp Thr Asp Gly Asp Ser Ile Pro
 675 680 685
 Asp Leu Trp Glu Glu Asn Gly Tyr Thr Ile Gln Asn Arg Ile Ala Val
 690 695 700
 Lys Trp Asp Asp Ser Leu Ala Ser Lys Gly Tyr Thr Lys Phe Val Ser
 705 710 715 720
 Asn Pro Leu Glu Ser His Thr Val Gly Asp Pro Tyr Thr Asp Tyr Glu
 725 730 735
 Lys Ala Ala Arg Asp Leu Asp Leu Ser Asn Ala Lys Glu Thr Phe Asn
 740 745 750
 Pro Leu Val Ala Ala Phe Pro Ser Val Asn Val Ser Met Glu Lys Val
 755 760 765
 Ile Leu Ser Pro Asn Glu Asn Leu Ser Asn Ser Val Glu Ser His Ser
 770 775 780

Ser Thr Asn Trp Ser Tyr Thr Asn Thr Glu Gly Ala Ser Val Glu Ala
 785 790 795 800
 Gly Ile Gly Pro Lys Gly Ile Ser Phe Gly Val Ser Val Asn Tyr Gln
 805 810 815
 His Ser Glu Thr Val Ala Gln Glu Trp Gly Thr Ser Thr Gly Asn Thr
 820 825 830
 Ser Gln Phe Asn Thr Ala Ser Ala Gly Tyr Leu Asn Ala Asn Val Arg
 835 840 845
 Tyr Asn Asn Val Gly Thr Gly Ala Ile Tyr Asp Val Lys Pro Thr Thr
 850 855 860
 Ser Phe Val Leu Asn Asn Asp Thr Ile Ala Thr Ile Thr Ala Lys Ser
 865 870 875 880
 Asn Ser Thr Ala Leu Asn Ile Ser Pro Gly Glu Ser Tyr Pro Lys Lys
 885 890 895
 Gly Gln Asn Gly Ile Ala Ile Thr Ser Met Asp Asp Phe Asn Ser His
 900 905 910
 Pro Ile Thr Leu Asn Lys Lys Gln Val Asp Asn Leu Leu Asn Asn Lys
 915 920 925
 Pro Met Met Leu Glu Thr Asn Gln Thr Asp Gly Val Tyr Lys Ile Lys
 930 935 940
 Asp Thr His Gly Asn Ile Val Thr Gly Gly Glu Trp Asn Gly Val Ile
 945 950 955 960
 Gln Gln Ile Lys Ala Lys Thr Ala Ser Ile Ile Val Asp Asp Gly Glu
 965 970 975
 Arg Val Ala Glu Lys Arg Val Ala Ala Lys Asp Tyr Glu Asn Pro Glu
 980 985 990
 Asp Lys Thr Pro Ser Leu Thr Leu Lys Asp Ala Leu Lys Leu Ser Tyr
 995 1000 1005
 Pro Asp Glu Ile Lys Glu Ile Glu Gly Leu Leu Tyr Tyr Lys Asn Lys
 1010 1015 1020
 Pro Ile Tyr Glu Ser Ser Val Met Thr Tyr Leu Asp Glu Asn Thr Ala
 1025 1030 1035 1040
 Lys Glu Val Thr Lys Gln Leu Asn Asp Thr Thr Gly Lys Phe Lys Asp
 1045 1050 1055
 Val Ser His Leu Tyr Asp Val Lys Leu Thr Pro Lys Met Asn Val Thr
 1060 1065 1070
 Ile Lys Leu Ser Ile Leu Tyr Asp Asn Ala Glu Ser Asn Asp Asn Ser
 1075 1080 1085
 Ile Gly Lys Trp Thr Asn Thr Asn Ile Val Ser Gly Gly Asn Asn Gly
 1090 1095 1100
 Lys Lys Gln Tyr Ser Ser Asn Asn Pro Asp Ala Asn Leu Thr Leu Asn
 1105 1110 1115 1120
 Thr Asp Ala Gln Glu Lys Leu Asn Lys Asn Arg Asp Tyr Tyr Ile Ser
 1125 1130 1135
 Leu Tyr Met Lys Ser Glu Lys Asn Thr Gln Cys Glu Ile Thr Ile Asp
 1140 1145 1150
 Gly Glu Ile Tyr Pro Ile Thr Thr Lys Thr Val Asn Val Asn Lys Asp
 1155 1160 1165
 Asn Tyr Lys Arg Leu Asp Ile Ile Ala His Asn Ile Lys Ser Asn Pro
 1170 1175 1180
 Ile Ser Ser Leu His Ile Lys Thr Asn Asp Glu Ile Thr Leu Phe Trp
 1185 1190 1195 1200
 Asp Asp Ile Ser Ile Thr Asp Val Ala Ser Ile Lys Pro Glu Asn Leu
 1205 1210 1215
 Thr Asp Ser Glu Ile Lys Gln Ile Tyr Ser Arg Tyr Gly Ile Lys Leu
 1220 1225 1230
 Glu Asp Gly Ile Leu Ile Asp Lys Lys Gly Gly Ile His Tyr Gly Glu
 1235 1240 1245
 Phe Ile Asn Glu Ala Ser Phe Asn Ile Glu Pro Leu Gln Asn Tyr Val

1250		1255		1260
Thr Lys Tyr Glu Val	Thr Tyr Ser Ser	Glu Leu Gly Pro	Asn Val Ser	
1265	1270	1275	1280	
Asp Thr Leu Glu Ser	Asp Lys Ile Tyr	Lys Asp Gly Thr	Ile Lys Phe	
	1285	1290	1295	
Asp Phe Thr Lys Tyr	Ser Lys Asn Glu	Gln Gly Leu Phe	Tyr Asp Ser	
	1300	1305	1310	
Gly Leu Asn Trp Asp	Phe Lys Ile Asn	Ala Ile Thr Tyr	Asp Gly Lys	
	1315	1320	1325	
Glu Met Asn Val Phe	His Arg Tyr Asn	Lys		
1330	1335			

C2